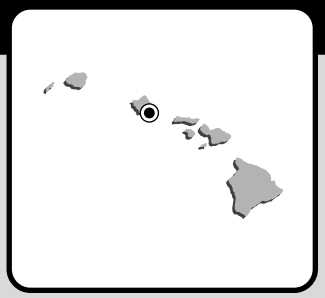
Pearl Harbor Naval Complex
Pearl Harbor, Hawaii



Engineering Field Division/Activity: PACDIV

Major Claimant: CINCPACFLT/COMNAVSEASYSCOM/COMNAVSUPSYSCOM/ COMNAVFACENGCOM

Size: 2,162 Acres

Funding to Date: $46,105,000

Estimated Funding to Complete: $206,217,000

Base Mission: Provides primary Fleet support in the Pearl Harbor area

Contaminants: Heavy metals, PCBs, perchloroethylene, pesticides, POLs, Stoddard solvent, volatile and semi-volatile compounds

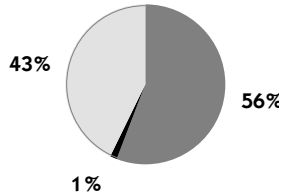
Number of Sites:		Relative Risk Ranking of Sites:			
CERCLA:	48	High:	36	Not Evaluated:	1
RCRA Corrective Action:	21	Medium:	1	Response Complete:	30
RCRA UST:	1	Low:	2	Total Sites:	70
Total Sites:	70				

NPL

EXECUTIVE SUMMARY

Pearl Harbor Naval Complex consists of six installations: Naval Station (NS), Public Works Center (PWC), Naval Shipyard (NSY), Fleet and Industrial Supply Center (FISC), Inactive Ship Maintenance Detachment (INACTSHIPDET), and Naval Submarine Base (NSB). The Navy's first installation, NS, was established in 1901. Most landholdings lie within the southern coastal plain of Oahu, west of Honolulu. NS contains maintenance, administrative, supply, and training buildings, bachelor housing, and personnel support facilities. PWC maintains Navy family housing units and utilities systems. NSY provides overhaul, repair, and conversion of surface craft and submarines. FISC includes aboveground and underground fuel storage facilities and a petroleum drumming plant. INACTSHIPDET provides for the inactivation, security, maintenance, cannibalization, disposal, readiness, and preparation for activation of naval ships and craft. NSB is homeport for almost 20 nuclear and conventional submarines, and provides facilities for operations, training, maintenance, housing, and personnel support. These operations have contaminated the soil and groundwater with volatile and semi-volatile organic compounds, heavy metals, the chemical additive PCB, pesticides, petroleum products, and solvents. The Navy has changed its operational processes to prevent further contamination. A Federal Facility Agreement (FFA) was signed in March 1994. EPA Region IX issued a Final RCRA Part B Permit in 1988. Pearl Harbor Naval Complex was included on the National Priorities List (NPL) on 14 October 1992. Dry cleaning solvents from a site located over a drinking water aquifer were primarily responsible for raising the HRS score.

Installations within the Pearl Harbor Complex are situated either at the Harbor itself or at the Pacific Ocean. Adjacent land use remains agricultural, however, fields are gradually being converted to housing and commercial uses. There are four significant wetland habitats in the Pearl Harbor area. Contaminants in this area could potentially migrate slowly toward the harbor or the Pacific Ocean, driven by low groundwater gradients induced by infiltration of local rainfall, or surface water runoff.



Current Status Of Sites

Studies Underway	39
Cleanups Underway	1
Response Complete	30
TOTALS	70

A Technical Review Committee (TRC) was formed in September 1990 and was converted to a Restoration Advisory Board (RAB) in 1994. The Board meets quarterly. A Community Relations Plan (CRP) was completed in June 1992 and updated in January 1996. Three Information Repositories were established in FY90, and an Administrative Record was established in FY92.

All cleanups have been completed at 30 sites. Currently, under CERCLA, 22 Site Inspections (SIs) have been performed, and four are underway. Three Remedial Investigation/Feasibility Studies (RI/FSs) have been completed and 18 are underway. Eleven Interim Remedial Actions (IRAs) have been completed, and 13 are underway.

Of the RI/FSs underway, one is expected to be completed in FY96, two are expected to be completed in FY97, and fifteen others by FY07. Ten more RI/FSs are scheduled and should be completed by FY05. Twenty-three Remedial Designs (RDs) are scheduled through FY08. Twenty-five Remedial Actions (RAs) are expected to be completed by FY20. One IRA is scheduled to begin and end in FY96. Of the IRAs underway, four are expected to be completed in FY96 and nine by FY13. Seventeen IRAs are planned for the future and should be completed by FY06.

Currently, under RCRA, 16 SIs have been performed and none are underway. Six RI/FSs have been completed and nine are underway. No IRAs have been performed or are currently underway. Of the nine RI/FSs underway, six are expected to be completed in FY96 and the other three in FY97. There are no RI/FSs planned beyond that. There are six RD and RAs scheduled through FY00. Twelve IRAs are planned for the future and should be completed by FY05. There is one Underground Storage Tank (UST) site (UST 1) currently undergoing remediation. An RA was initiated and is expected to be completed by FY96.

During the past fiscal year, an innovative technology was used to complete an IRA at the Red Hill Stilling Basin Site, at the FISC. The contaminated materials (sludge and soils) in and around the Stilling Basin consisted of diesel range and heavy-end petroleum products. An innovative low temperature thermal desorption/oxidation technology was used to treat contaminated soil excavated from the site. The Engineering Evaluation/ Cost Analysis (EE/CA) estimates that this treatment method is about one-quarter the cost of disposal at an off-island non-hazardous solid waste disposal facility. This method also provides moderate overall protection of human health and the environment in the least amount of time. This is the first Hawaii Navy Installation Restoration (IR) site to use this technology.

PEARL HARBOR NAVAL COMPLEX
RELEVANT ISSUES

ENVIRONMENTAL RISK

HYDROGEOLOGY - The Hawaiian Archipelago is composed of a series of immense volcanic ridges, the Hawaiian Islands being located at the southernmost end. The island of Oahu is the result of two large shield volcanoes. The caprock in the vicinity of Pearl Harbor is composed of alternating layers of shallow marine limestone and volcanic alluvium. Local fracturing and bedding structures may complicate migration pathways. The Navy installations are underlain by a shallow water table which approximates the elevations of sea level. This groundwater probably migrates generally toward either Pearl Harbor or the Pacific Ocean and is replenished by rainfall infiltration. For near shore areas it is reasonable to assume that waterborne contaminants would reach the harbor. Groundwater in nearshore areas must be subject to some degree of tidal influence, which would result in increased dispersion of contaminants migrating toward the harbor. For inland areas influenced by the Honolulu volcanics, migration pathways are less certain. Contaminants in the shallow groundwater system should eventually reach the harbor or the Pacific Ocean. Several streams cross Navy lands before emptying into Pearl Harbor or the Pacific Ocean. Some groundwater flow may discharge to the streams crossing Navy land. The streams would also constitute possible pathways for potential contaminant migration. Potable water supplies for the Pearl Harbor and Honolulu areas are developed further inland in the Koolau Range basalts. In the Pearl Harbor area, water in the Koolau basalt is confined under artesian pressure by several tens to several hundreds of feet of the caprock sequences. No contamination in the Pearl Harbor area can migrate downward into the artesian system or upgradient to supply areas, except in the Red Hill area, where Koolau basalt is exposed at the surface and not covered by caprock. Water in the basalt aquifer is trapped by the confining layers of the coastal plain caprock, creating an artesian condition. In the early part of the century, numerous wells were drilled in the vicinity to develop increasing water supplies from the artesian portion of the basalt aquifer. Extensive withdrawals eventually caused a decline in the pressure and induced more saline waters to rise into the producing zone. Many wells had to be abandoned. The naval base obtains 70-90 percent of its potable water supply from a water tunnel located in Waiawa. The remainder is supplied by tunnels at Red Hill and Halawa.

NATURAL RESOURCES - In the vicinity of Pearl Harbor, wetland areas support a variety of plant and animal life. There are four significant wetland habitats in the Pearl Harbor area. Sport fish and commercial bait fish are caught in Pearl Harbor. Endangered species in Hawaii include one Hawaiian mammal and 28 Hawaiian birds - more than half of the nation's endangered birds. Threatened or endangered species that may be found near known sites include the plant 'Ewa Plains 'akoka and birds: the Hawaiian coot or 'Alae Ke'oke'o, the Hawaiian duck or Koloa, the Hawaiian gallinule or 'Alae 'ula, the Hawaiian stilt or Ae'o, and the Hawaiian owl or pueo. Pearl Harbor Naval Complex has been designated as a National Historic Landmark.

RISK - There are 36 sites currently ranked with a high relative risk. The high ranking was primarily due to contamination in the soil and marine sediment. There have been various releases of contaminants to the soil. The pathway of concern is direct contact with the soil by humans. Also, contaminants have been identified in the marine sediment of Pearl Harbor. Contaminants reach the harbor via surface runoff or subsurface migration. Pathways of concern are consumption of fish and shellfish by humans and endangered species.

REGULATORY ISSUES

NATIONAL PRIORITIES LIST - Pearl Harbor Naval Complex was included on the National Priorities List (NPL) on 14 October 1992 based on a Hazard Ranking System (HRS) score of 70.82. Dry cleaning solvents from a site located over a drinking water aquifer were primarily responsible for raising the HRS score.

LEGAL AGREEMENTS - A Federal Facility Agreement (FFA) was signed on 17 March 1991 and became effective on 19 July 1991 after a public comment period. The agreement is updated only when new environmental issues arise which require negotiations. The FFA also covers four sites at Lualualei Naval Magazine West Loch Annex which are not currently counted in the Pearl Harbor Naval Complex site count. They are still under NAVMAG Lualualei in Defense Site Environmental Restoration Tracking System (DSERTS). EPA Region IX issued a Final RCRA Part B Permit (HI1170024334) effective 15 September 1988, to operate a hazardous waste storage facility. The permit required that a RCRA Facility Investigation (RFI) work plan be prepared for the 182 Solid Waste Management Units (SWMUs) listed in the RCRA Facility Assessment (RFA) within 450 days after the effective date of the permit. An RFI work plan was completed in December 1989 and was approved by EPA Region IX and Department of the Navy (DON) in 1991. During the development of the RFI work plan, the DON identified 32 additional SWMUs and recommended three of these SWMUs for further investigation. A petition to close the NSY Spent Abrasive Grit Storage Area SWMU was submitted to EPA Region IX in May 1993.

PARTNERING - In 1994, several partnering sessions were held with the installation, the state and EPA Region IX. The partnering relationship resulted in the identification and resolution of problems prior to implementation of work at various sites. The installation also holds meetings with the state to reach a consensus on investigation and cleanup goals, which help expedite the review process and reduce impediments to cleanup.

COMMUNITY INVOLVEMENT

RESTORATION ADVISORY BOARD - A Technical Review Committee (TRC) was formed in September 1990 and was converted to a Restoration Advisory Board (RAB) in 1994. The board meets quarterly at the Pearl Harbor NSY. There are ten RAB members from the community. Two members represent local neighborhood boards, two members represent environmental interest groups, three members represent elected officials, one member represents a group of employees on the installation, and two members are interested citizens from the local community. The RAB has recommended changes in the scope of an investigation that has helped to identify contamination in an area previously regarded as clean and to prepare a more comprehensive risk assessment. The RAB has also identified the need to initiate work to mitigate possible further migration of contaminants from a site.

COMMUNITY RELATIONS PLAN - A Community Relations Plan (CRP) was completed in June 1992 and updated in January 1996. In addition, a Fact Sheet was completed in September 1990 and revised in August 1992. Several new Fact Sheets have been prepared for TRC/RAB meetings.

INFORMATION REPOSITORY - Three Information Repositories were established in FY90, and an Administrative Record was established in FY92. The Information Repository for the sites within the Pearl Harbor Complex is located at the Aiea Public Library. The Information Repository for sites at outlying areas is located at the Pearl City Public Library. A third Information Repository is located at the Ewa Beach Public and School Library for sites at Naval Magazine Lualualei. The Administrative Record is located at Pacific Division (PACDIV), Naval Facilities Engineering Command. A copy of the Administrative Record documents are contained in the Information Repositories.

Pearl Harbor Naval Complex
HISTORICAL PROGRESS

FY84

Sites 1-30 - An Initial Assessment Study (IAS), equivalent to A Preliminary Assessment (PA), was completed in October 1983. Site 3 is located under Highway 1; clean fill was used to cover the site and no contaminated soil was excavated. The Department of the Navy (DON) has notified EPA of No Further Action (NFA) and the site has been closed out. Sites 5, 6, 9, 11, 12, 14, 15, 20, 23 and 26 were found not to pose a threat to human health or the environment and NFA was recommended. EPA Region IX requested additional investigation for Site 30, but later agreed not to pursue further investigation.
Site 43 (PWC) - This site was originally identified as part of Site 4. However, because the site was a burn area and not a landfill, it was designated as a separate site.

FY87

All SWMUs - A RCRA Facility Assessment (RFA), completed in January by EPA Region IX, identified 182 potential Solid Waste Management Units (SWMUs). Several of the 182 SWMUs are being managed under the Installation Restoration Program (IRP) or the Underground Storage Tank (UST) program, or were recommended for NFA.

FY88

Site 7 (NS) - A Site Inspection (SI) was completed. The report found minimal presence in the soil of the chemical additive PCB and recommended NFA.
Site 4 (PWC) - An SI was completed. Petroleum products in groundwater were significantly below cleanup action guidelines. Petroleum products in sediment were very low or below the detection limit. Biological samples were within expected ranges except for calcium and aluminum. Semi-volatile organic compounds (SVOCs) were found at low concentrations indicating no threat to human health or the environment.
Site 33 (FISC) - A PA was completed in August.

FY89

Site 2 (PWC) - An SI was completed. The report found soil contaminated with pesticides, arsenic, and unidentified organic compounds.
Site 31 (NS) - This additional site was identified during a DON safety inspection.
Site 36 (FISC) - This site was added to the IRP when free floating product was discovered during the installation of new underground tanks.
Site 22 (FISC) - An SI was completed. The report found soil contaminated with petroleum products and SVOCs.
SWMU SB-37 (NSB) - An RFA was completed.

FY90

Site 31 (NS) - An SI was completed. The report confirmed the presence of the organic solvent PCE in the soil.
Sites 35 and 38 (NS) - A PA was completed that identified these two new sites. Site 35 was recommended for further action due to the potential subsurface transport of contaminants. Site 38 was not recommended for further action because there was no indication of hazardous material used or generated at the site.
Site 37 (NSY) - This new site was discovered in 1990. The site consists of a sump in an abandoned building.
Site 36 (FISC) - A PA was completed; the site was recommended for a Remedial Investigation/Feasibility Study (RI/FS) without an SI.
Sites 21, 24 and 27 (FISC) - An SI was completed. The report found evidence of sludge contaminated with petroleum products at Site 21, petroleum products contaminated soil at Site 24, and free product accumulation in a trench, but found no indication that free product had migrated beyond the trench at Site 27. The report recommended that floating product in the trench be removed, and recommended all three sites for an RI/FS.
Site 28 (NSB) - An SI was completed in July. The report found no significant contamination, and the site was recommended for NFA.
SWMU SB-37 (NSB) - A RCRA Facility Investigation (RFI)/Corrective Measures Study (CMS) was initiated.

FY91

Site 31 (NS) - Additional characterization of this site was completed in January 1991 to identify areas of significant contamination requiring a Removal Action (RA). The organic solvents TCE and Stoddard Solvent were detected in soils.
Site 32 (NS) - This additional site was identified during the RA at one transformer station contaminated with the chemical additive PCB. An SI was completed in April. The report confirmed the presence of the chemical additive PCB in the soil at the site. An Interim Remedial Action (IRA) was completed in September. This action involved the excavation and off-site disposal of the presence of PCB in the soil. NFA is anticipated at Site 32.
Site 35 (NS) - An SI was completed in June and petroleum product contamination was confirmed.
Site 39 (FISC) - This new site was identified prior to proposed property transfer to the State of Hawaii.
Site 34 (PWC) - This new site was identified in April upon completion of a Preliminary Assessment/Site Inspection (PA/SI). The report found that the concrete floor under approximately 139 transformers have PCB-contaminated concrete floor slabs. Twelve of these sites have PCB contamination. The remaining 127 sites will be characterized further in an RI/FS.
Site 44 (FISC) - This new site was added due to concerns regarding possible fuel leaks.

FY92

Sites 10 and 13 (NSY) - The Remedial Investigation (RI) field work was completed in June.
Site 19 (NS) - An SI was completed in June. The report confirmed silver, petroleum products, and the chemical additive PCB contamination at the site.
Sites 10, 13 and 16-18 (NSY) - An SI, completed in June, found lead in the soil at Site 10, the chemical additive PCB in sediment at Site 13, metals in soil at concentrations below regulatory action levels at Site 16, concentrations of chromium, lead, and zinc at levels allowable for industrial land use at Site 17. Site 18 could not be located. The SI recommended NFA at Sites 16-18, and further investigation for Sites 10 and 13.
Site 37 (NSY) - A PA was completed in March; the site was recommended for an RI/FS without an SI.
Site 13 (NSY) - An RA involving the removal of sludge and sediment containing the chemical additive PCB was completed in February.
Site 34 (PWC) - An IRA was completed. Transformers with oil containing the chemical additive PCB were removed, fencing was installed around the areas of containment, and a monitoring program was implemented for retrofilled transformers.

FY93

Site 8 (NS) - An SI was completed in September. Sediments were sampled in several locations offshore of Ford Island. Metals, volatile organic compounds (VOCs), petroleum products, pesticides, and the chemical additive PCB were detected in the sediments; metals, volatile organics, and pesticides were detected in the groundwater; and metals, petroleum products, volatile and semi-volatile organic compounds, chlorinated solvents, pesticides, herbicides, and the chemical additive PCB were detected in soils.
Site 4 (PWC) - An Expanded Site Inspection (ESI) was completed in March. The ESI found the chemical additive PCB, the Navy fuel JP-4, benzene, mercury, and lead, and the site was recommended for RI/FS.
Site 39 (FISC) - An SI was completed in January. Test results showed elevated concentration of the chemical additive PCB, petroleum products, the pesticide dieldrin, and heavy metals in the soil. Further investigation and a risk assessment to examine the pesticide dieldrin contamination were recommended. Based on the SI recommendations and the need to

Pearl Harbor Naval Complex

expedite cleanup for the property transfer, DON decided to move directly to Remedial Design/Remedial Action (RD/RA) without an RI/FS. The IRA involving the excavation of soil contaminated with the chemical additive PCB was completed in March.
SWMUs NAS-3, NAS-4 and NAS-6 (NS); SY-5, SY-17, SY-35, SY-44 and SY-84 (NSY); NSC-13, PWC-1, PWC-10, PWC-13 and PWC-15-18 (PWC) - The RFI Report was completed and submitted to EPA Region IX.
SWMU 18 (PWC) - A CMS was completed.

FY94

Site 31 (NS) - An RA was completed in December. This action involved the excavation and off-site disposal of contaminated soil, removal of four USTs, and removal of one drain line.

Sites 40-42 (NSY) - Three new sites were identified by the activity. Site 40 was found during the RI phase. A PA/SI began in June.
Site 43 (PWC) - An SI began in June.
Site 33 (FISC) - An SI was completed; the site was recommended for an RI/FS.
Site 44 (FISC) - A PA was initiated in August.
Sites 19 and 31 (NS) and 33 (FISC) - An RI/FS began.
Site 34 (PWC) - A second RA was initiated to remove contaminated soil.
Site 36 (FISC) - An IRA involving a free floating fuel recovery system was completed in March. A pilot-scale extraction test pumped groundwater and skimmed free product. No hazardous waste was generated because the free product was recovered and recycled in the Navy's Fuel Reclamation Facility.
Site 39 (FISC) - The RA involving the excavation of soil contaminated with the pesticide dieldrin was completed in February.

PROGRESS DURING FISCAL YEAR 1995

FY95

Site 2 (PWC) - An RI/FS was completed. Contamination is minimal.
Site 10 (NSY) - The RI/FS was completed.
Site 44 (FISC) - A PA was completed.
Site 48 (PWC) - A PA was completed.
SWMUs 3 (NS); 5 and 35 (NSY); 32 and 37 (NSB) - CMSs were completed.
Site 50 (NS) - Site 50, the NEX Warehouse site, was added to the IRP in FY95. An IRA was completed. Soil contaminated with petroleum products was removed.

Site 10 (NSY) - Two IRAs were initiated.
Site 13 (NSY) - Two IRAs were completed.
Sites 46 (NSY) and 47 (PWC) - IRAs were initiated.
Site 22 (FISC) - An IRA was completed. It involved the removal and closure of a stilling basin which contained oily wastes, mainly sludge from UST cleaning. The stilling basin structure and the grossly petroleum product contaminated soil beneath and surrounding the stilling basin were removed. Soils were treated by a low temperature thermal desorption facility. Treated soils were returned to the site and used to backfill the excavation. The area was then capped.
UST 1 (NS) - An RA was initiated.

PLANS FOR FISCAL YEARS 1996 AND 1997

FY96

Site 27 (FISC) - Another phase of the RI (involving off site sampling) is expected to be initiated.
Site 22 (FISC) - Phase II of the RI is expected to be initiated.
Site 2 (PWC) - Two IRAs are expected to be initiated.
Sites 40-42 (NSY) - An RI/FS is expected to be initiated.
Sites 10 (NSY) and 33 (FISC) - An IRA is expected to be completed.
Sites 4 (PWC) and 41 (NSY) - An IRA is expected to be initiated.
SWMUs 4 (NS); 40, 44 and 84 (NSY) - An IRA is expected to be initiated.
SWMUs 12, 13 and 26 (NSB); 40, 44 and 84 (NSY) - CMSs are expected to be completed.
UST 1 (NS) - An RA is expected to be completed.

FY97

Site 4 (PWC) - An RI/FS is expected to be completed.**Site 13 (NSY)** - The RI/FS is expected to be completed.
Sites 40-42 (NSY) - A PA and an SI are expected to be completed.
Site 44 (FISC) - An SI is expected to be completed in FY97.
Site 22 (FISC) - An RI/FS is expected to be completed.
SWMUs 1, 10 and 13 (PWC) - A CMS is expected to be completed.
SWMUs 15-18 (PWC) - An IRA is expected to be initiated to remove contaminated soil.

Pearl Harbor Naval Complex
PROGRESS AND PLANS

CERCLA	FY94 and before	FY95	FY96	FY97	FY98	FY99	FY00	FY01 and after
PA	41	2		3				
SI	22			4				
RI/FS		3		2	1			20
RD							1	22
RA								25
IRA	7(8)	2(3)	2(4)		3(3)	2(2)	2(3)	17(17)
RC	18						1	29
Cumulative Response Complete	38%						40%	100%
RCRA CA	**FY94 and before**	**FY95**	**FY96**	**FY97**	**FY98**	**FY99**	**FY00**	**FY01 and after**
RFA	21							
RFI	16							
CMS		5	6	3				
DES						6		
CMI						6		
IRA				1(1)				8(8)
RC	7	5				3	3	3
Cumulative Response Complete	33%	57%				71%	86%	100%
UST	**FY94 and before**	**FY95**	**FY96**	**FY97**	**FY98**	**FY99**	**FY00**	**FY01 and after**
ISC	1							
INV	1							
CAP								
DES	1							
IMP			1					
IRA			1(1)					
RC			1					
Cumulative Response Complete			100%					